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ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

The Fourteenth Annual Meeting of the pioneer confederation of American gas engineers, the New England Association, was held at the appointed time, Feb. 20th and 21st, at Young's Hotel, Boston, Mass. The simple statement that this body merits the title of the pioneer band leads us back to the sad occasion when the topic of organization was first broached. It is matter still fresh in the recollection of many members of the New England Association that the gas managers concerned in the consultation, held at the Bay State House, in Worcester, on the date referred to by President Slater in his address at the late Boston meeting, were gathered together primarily for the purpose of paying the last tribute of respect and affection to the memory of a deceased fellow-brother, James Barnard Blake, the then superintendent of the Worcester Gas Works, as also the Mayor of the city, who literally died in harness, having received fatal injuries through the occurrence of an explosion in the purifying house of that company on Friday, December 16th. It is thus shown that out of sorrow even may consolation grow, and a worthy monument to Mr. Blake's memory has been reared by his brother engineers having sympathy for its foundation stone.

Nature was beautiful and diversified in her weather arrangements; Wednesday was really stormy, Thursday was bright and serene. But we failed to note that the proceedings were any the less enthusiastic, despite the rain and the snow, nor increased by the exhilaration of more agreeable climatic influences—for the interest never, at any part of the proceedings, flagged in the slightest, being steadily maintained during the entire time of the meeting.

The meeting was called to order promptly at 11 A.M., on the 20th, by President A. B. Slater. The reading of minutes of last meeting was dispensed with, the members having become posted in the same through the columns of the JOURNAL as to what had been done at the session of 1883. Roll call showed a great attendance, gratifying in every respect, foreshadowing the interest which had been aroused. Besides the other members we noticed the familiar faces of C. J. R. Humphreys, Secretary of the American Association; Eugene Vanderpool, of Newark, N. J.; Capt. Fred. S. Benson, Brooklyn, N. Y.; T. G. Lansden, St. Louis, Mo.; and many others far too numerous for our space to chronicle.

All who know Mr. A. B. Slater personally need not be told that he is eminently a practical man, and those who have never had personal relations with him need only review his admirable annual address, given in its proper place in the record of the proceedings in this number of the JOURNAL, to become thoroughly alive to his straightforward common sense. His "annual message" bristles with fruitful themes for mental thought and practical application. We would like, at this point, to ask particular attention to a consideration of the recommendation made in regard to special committee work. All legislative bodies find it necessary, in order that proposed measures be thoroughly sifted as to worth and value, to refer such questions to a smaller number of their assembly. While the various associations of gas engineers cannot strictly be called legislative bodies, they are really analogous to such, since the outcome of their action should be as law when once promulgated. Let the members of this Association, in the interval between now and February next, study the subject closely, and come prepared, at the next annual meeting, to evolve a way by which Mr. Slater's suggestion can be fairly tried. Space prevents us from handling in detail all the points of President S.'s excellent communication, and once again ask our readers to give it that attention which its merit deserves.

Secretary Neal's report shows a solid financial condition of affairs, a result in no small degree traceable to his own sagacious management. We had hoped for a more lengthy report from the Committee on Statistics, but must perforce content ourselves with that rendered. The Association is evidently not disposed to let this committee go by default, as it was continued for another year, when we look for something more definite than "progress."

The action taken by the Association in regard to offering prizes for competitive papers did not meet with the results anticipated; and we are

obliged to submit that this is discouraging. In response to the terms of the offer made but two papers were presented, both of which were subsequently withdrawn, and handed over to the Executive Committee for approval to be read in the regular manner. Although the competitive offer did not work as well as was anticipated, nevertheless the papers that were read before the meeting contain more than usually interesting matter, treating, as they do, of actual happenings and incidents in the gas plants of the respective authors. The following are the titles of the subjects, with the names of the contributors, in so far as we can give the latter, the withdrawn prize papers not bearing the writer's names :

"Red Brick in Brickwork," by H. A. Allyn; "Modification of the Dieterich Furnace," by C. H. Nettleton; "Benzine in Gas," by R. B. Taber; "Description of New Works at Pawtucket, R. I., and Practical Working of Same for the Past Five Months," by S. G. Stiness; "Vigilance the Price of Success in Gas Making;" "The Weakening of Mains by Tapping." These will all follow in due course.

The interest in the first days's meeting was fully kept up, from the calling to order, at 11 A. M. (with a short interim for lunch at 1 A. M.) until 5.30 P. M., when the session was adjourned, in order to give the members time to prepare for the annual banquet, the hour for which festive gathering had been fixed at 6 P. M. The banquet was served in the large and elegant dining hall of Young's Hotel; to do it justice with our pen we fear we cannot compass. Still, the most fastidious epicurean appetite (and our New England friends, by-the-way, know pretty well what is pleasant and filling to the inner man) had nothing left to crave for. It goes without saying that full justice was done to the edibles (there were other kinds of nourishment beside solids) by upwards of 100 guests. Hunger appeased, a very entertaining time was passed in listening to the various toasts and responses thereto, and all too quickly "sped the evening hours away."

Next morning (Thursday, 21) the meeting was called to order at 10 o'clock, regular order of business being proceeded with. This day's session developed a new feature of exceeding benefit and importance, and, in our opinion, a feature well calculated to be worth following out at all future meetings of this and o her kindred associations. Simply stated it was the submission of a question by any member on any topic on which such member was desirous of gaining information. The divers questions asked, and the prompt and ready replies given thereto, certainly made this part of the session very attractive to the questioners, answerers, and listeners. This style of procedure was kept up until 1 o'clock P. M., when, after all routine business had been transacted, the Association adjourned.

The members and guests, to the number of 70, in response to a general invitation extended by Mr. W. W. Greenough, of the Boston Gas Light Company, took the Old Colony Railroad to Harrison Square station, and from thence were conveyed in carriages to the new Commercial Point works of the above named company. A portion of this plant is now almost ready for use. The visitors were pleased with the sights there beheld, and came away much impressed with the many niceties of construction observed during the progress of inspection. Space again compels to omit much that might be said in this connection, in order to give our readers some explanation of the magnitude of Boston's new gas works; we propose to refer to the subject again, when we hope to be enabled to do full justice to the matter.

The Association selected as its officers, for the ensuing year, the following gentlemen: President, M. S. Greenough, Boston, Mass.; First Vice-President, John P. Harbison, Hartford, Conn.; Second Vice-President, Hon. A. M. Norton, Nashua, N. H.; Secretary and Treasurer, Geo. B. Neal, Boston, Mass.; Directors, Messrs. William A. Stedman, Everett C. Learned, William Yorke, C. L. Gerould and John Cabot.

We would like to call the attention of the Association to what appears a manner of procedure admitting of improvement. The rule at present is that the gentlemen elected to succeed the retiring board of officers shall take office immediately after the ballot is held. Why not alter this so as to leave the charge of affairs in the hands of the retiring officials until the regular meeting has adjourned; or, rather, make the official life of the board extend up to the time that each annual meeting *ends?* As it now stands the board of officers does not have exclusive control of the meeting for which it has arranged the programme, and it is reasonable to suppose that those who made the arrangements could more acceptably carry them out, to say nothing of the embarassment experienced by those called upon to immediately conduct affairs the routine of which they are entirely unfamiliar with.

In conclusion, we are more than pleased to place upon record the fact that the Fourteenth Annual Meeting of the New England Association was one of the best ever held by that body, and will undoubtedly be of benefit to every one who attended it. We hope the Association may go on into the future as prosperously as it has done in the past, and with each succeeding year increase in usefulness and vigor. For the many courtesies rendered to the representatives of this JOURNAL we hereby tender our sincere thanks, the receipt of which will always be held in grateful remembrance by us.

ABOUT THE TAR COMBINATION.

Messrs. Barrett & Kimball, of Chicago, Ill., the exclusive contractors for the coal tar of the Chicago Gas Light Company, besides being also the "absorbers" of the tar made in the gas works of several other Northwestern cities, in a communication, published in our issue of January 16th, take us to task for stating that one of the objects of the recently created coal tar distillers' combination was to securely protect themselves against real competitive bids in the matter of purchasing that residual product of the gas maker, coolly, not to say impudently, charging that our informant was wilfully and maliciously untruthful.

Since our authority was one of the parties to this very (to say the least) injudicious league, we cannot believe his intention was to mislead, nor are we inclined to the other end of the statement that his motives had their foundation in malice. In further direct confirmation of the precise credibility of our informant, and that he knew whereof he spoke, may be noted the fact that, up to the time of the consummation of this scheme, there was exhibited sharp competition on the part of would-be purchasers of the tar product of one of our large New York city companies, whose previous five-year contract, obtained at a ridiculously low figure, was about expiring. The contract was renewed without the slightest contest; the valuable plum falling thus easily into the hands of a corporation managed by the leading spirit of this co-operative combination. Indeed, it is rumored, and with great show of reason, without shade of malice, that the chief incentive, the mainspring of action, to the whole enterprise was the simple removal of any possibility of competition for this very contract.

In contrast to this we would call the attention of every gas manager in the country to the widely different result of fair and open competition in the case of the contract obtained by another New York city gas company, entered into last summer, which company obtained the then market value for its coal tar—upwards of 35 cents per ton of coal carbonized. While we are not advised of the exact price paid the first-named company, which was compelled to sell to one buyer, without any real competition, we claim the Yankee privilege of "guessing" that it was not twenty cents per ton.

Furthermore, we insist that this combination is particularly ungraceful, as the managers of our gas companies have always been lenient in dealing with their contractors in times of unusual depression, voluntarily reducing contract prices. It is a well-known fact that the firm of coal tar distillers referred to were not only, some years ago, granted large reductions from time to time, on their contract prices, but, in several instances, were actually *given* the coal tar during a term of many months.

In further support of the absolute truthfulness of the assertions which seem to be particularly obnoxious and unpalatable to Messrs. Barrett & Kimball, managers of gas companies, both East and West, are already complaining of the sudden cessation of competitive inquiries. Again, it is at once ludicrous and absurd to attempt to convince the gas fraternity that a combination for selling coal tar products could be effected without one of the main stipulations being a thorough understanding among the projectors that there should be no interference with one another's contracts, and a further understanding that a pro rata division of the coal tar, at an average price, should be made in cities where two or more distilling firms happened to be located.

A careful reading of the shrewdly-worded communication from the Northwestern arm of this newly created confederation appears to reveal the special pleading of some professionally retained Chicago barrister, who was not informed, or possibly had forgotten, that the total value of the 150,000 to 300,000 bbls. coal tar assumed to be carried in stock, at the average prices paid for it, would not exceed $100,000 to $200,000—very modest figures for this rapacious would-be syndicate, with its million and a half of capital.

It is indubitably capable of proof that the coal tar distilling industry has been exceptionally prosperous up to the fall of '83, and has been since only sharing, and that in slight degree, the almost universal depression in all classes of trade. Certain it is that should the details of the distillers' conferences be successfully carried out, such action is bound to enormously increase the profits of the people who have essayed to organize a coal tar combination modeled somewhat upon the famous "Standard" lines.

In conclusion, we are bound to state that our article has created precisely the "impression designed," and such impression was not destined to be based on an "invented version," but is simply an "o'er true tale." We repeat the suggestion that the gas makers of America will never obtain the present and long continued English and Continental price for this, and other residuals, until they work them up on their own account.

GAS HEAT APPLIED TO TRADE PURPOSES.

In another part of this issue we reproduce, with illustrations, a paper read before the Society of Arts, London, by Mr. Thomas Fletcher. The author enumerates some of the varied uses to which coal gas may be employed as a labor-saving agent in mechanical trades; and while the advances already made in this direction have been very marked, the outlook for the future seems almost unlimited. The article is well worth reading.

[Official Report.]

Fourteenth Annual Meeting of the New England Association of Gas Engineers.

Held at Young's Hotel, Boston, Mass., Feb. 20 and 21, 1884.

First Day—Morning Session—Feb. 20.

The New England Association of Gas Engineers held their Fourteenth Annual Meeting, at Young's Hotel, Boston, Mass., on the 20th and 21st days of February. The Convention was called to order at 11 o'clock, on the morning of 20th, with the President, Mr. A. B. Slater, in the chair.

On motion of Mr. F. C. Sherman, the reading of the minutes of last meeting was dispensed with, and the record of same, as published in American Gas Light Journal, approved as printed.

The calling of the roll was then proceeded with, and the following gentlemen responded to their names:

Roll Call.

Honorary Member.

Joseph R. Thomas, New York City.

Active Members.

John P. Harbison, Hartford, Conn.	Edward Jones, Boston, Mass.
William Yorke, Portland, Maine.	Milton Jewett Clinton, Mass.
William D. Cadwell, Nashau, N. H.	Edward C. Jones, Boston, Mass.
L. P. Gerould, Manchester, N. H.	H. B. Leach, Taunton, Mass.
C. L. Gerould, Manchester, N. H.	Charles D. Lamson, Boston, Mass.
John M. Hill, Concord, N. H.	W. A. Learned, Newton, Mass.
A. M. Norton, Nashua, N. H.	David Moore, Salem, Mass.
T. R. Martin, Portsmouth, N. H.	Richard J. Monks, Boston, Mass.
John Andrew, Chelsea, Mass.	George B. Neal, Boston, Mass.
Horace A. Allyn, Cambridge, Mass.	C. F. Prichard, Dedham, Mass.
H. A. Atwood, Plymouth, Mass.	E. G. Pratt, North Attleboro', Mass.
David Brayton, Brockton, Mass.	J. H. Rollins, Worcester, Mass.
John H. Burnham, Boston, Mass.	C. F. Spaulding, Brookline, Mass.
George D. Bill, Malden, Mass.	W. H. Snow, Holyoke, Mass.
David Boynton, Chicopee, Mass.	C. S. Spaulding, Brookline, Mass.
F. C. Blood, Ware, Mass.	William Tarbell. Waltham, Mass.
George D. Cabot, Lawrence, Mass.	D. D. Tilton, Newburyport, Mass.
Oliver E. Cushing, Lowell, Mass.	J. R. Todd, Natick, Mass.
H. F. Coggshall, Fitchburg, Mass.	Robert B. Taber, New Bedford, Mass.
D. W. Crafts, Northampton, Mass.	A. W. Tarbell, Waltham, Mass.
John Cabot, Lawrence, Mass.	Gideon Wood, New Bedford, Mass.
Patrick Coyle, Boston, Mass.	*J. H. Armington, Providence, R. I.
J. A. Coffin, Gloucester, Mass.	Samuel G. Stiness, Pawtucket, R. I.
W. B. Durfee, Jr., Fall River, Mass.	William A. Stedman, Newport, R. I.
F. R. Davis, Athol, Mass.	A. B. Slater, Providence, R. I.
Samuel Fowler, Westfield, Mass.	Ogden Gilmor, Norwich, Conn.
W. W. Greenough, Boston, Mass.	E. C. Learned, New Britian, Conn.
M. S. Greenough, Boston, Mass.	C. H. Nettleton, Birmingham, Conn.
Estes Howe, Cambridge, Mass.	F. C. Sherman, New Haven, Conn.
J. L. Hallett, Springfield, Mass.	C. W. Cochrane, Gloucester, Mass.
J. F. Rogers, Boston, Mass.	W. K. Stratton, Haverhill, Mass.
J. Q. A. Spear, Boston, Mass.	Aaron Thompson, Woburn, Mass.
L. W. Wells, Marblehead, Mass.	G. E. Wetherbee, Roxbury, Mass.

There were also present E. Vanderpool, T. G. Lansden, F. S. Benson, C. J. R. Humphreys, and many others.

NEW MEMBERS.

The following-named gentlemen were recommended by the Executive Committee for active membership:

A. H. Barker, Bangor, Maine.	Z. M. Jenks, Woonsocket, R. I.
A. D. Perry, Quincy, Mass.	F. S. Richardson, North Adams, Mass.

On motion of Mr. S. G. Stiness, these applicants for membership were declared duly elected, the Secretary casting a ballot in favor of same on behalf of the Association.

The Association then listened to the reading of President Slater's address.

PRESIDENT'S ADDRESS.

Gentlemen:—To-day completes the thirteenth year of our existence as an Association. Little did that small group of gas managers who consulted together at the Bay State House, in the city of Worcester, on that memorable 22d day of December, 1870, imagine that in a little more than a single decade this Association would comprise a membership of nearly 100 names. Our annually increasing numbers give evidence of the magnitude and progress of our business, and the interest manifested by those who are engaged in its development. The single fact of meeting together at stated periods, the pleasant conversations, the little groups consulting together on all the various questions which are continually brought to our attention, are indeed pleasing to us all, and awaken feelings in many a heart that, although never expressed in words, are none the less responsive, but are quietly interwoven with one's daily life, and suggest fruitful subjects for thought for many a day and month thereafter.

In an Association like this, composed as it is of 80 odd members, it is hardly to be expected that our ranks will continue unbroken for even the short term of a single year; but, as far as I have learned, our list of active members remains the same as when we adjourned one year ago. But the unwelcome messenger is ever active, and singles out his victims oftentimes when least expected, and strikes down at one fell blow the strongest and most vigorous among us. There was one who, while not an active member of our Association, has been most intimately connected with us, not only as an honorary member, but he took a special interest in all our meetings, was always with us, was a leader in the profession, was one who, by his presence, his example, and his earnest efforts, was ever urging us on to duty and progress; one whom we all delighted to honor, whose genial presence we sadly miss to-day. At our last annual meeting, as instructed by a vote of the Association, I communicated to him the good wishes, the kindly feelings and sympathy of all the members of the Association; and although he was then suffering severely from the malady which terminated his life, he promptly responded by dictating a telegram which was characteristic of his genial spirit when in health, and which all who were present at that meeting well remember. Major G. Warren Dresser was one of the advanced representative men of the gas interest of this country. He was earnestly interested in and thoroughly devoted to the profession which he honored, and his loss is most deeply felt by this Association.

In less than two weeks following the death of Major Dresser another of our esteemed associates, Mr. William H. Price, of Cleveland, Ohio, was stricken down by death. We were accustomed to his presence at the meetings of the American Gas Light Association, as well as at our New England meetings, in which he always took a lively interest. It was my good fortune to be well acquainted with Mr. Price. As a member of the Executive Committee of the American Gas Light Association, of which he was the honored President, I was brought into intimate relations with him, and for several years was associated with him in consultations upon various subjects, by correspondence and otherwise, and I learned to respect and revere him as a man of great kindness of heart, sterling integrity, a firm adherent of principle and honor, and as a man whose great moral influence reaches out into the world and encourages faith in humanity.

In the death of Major G. Warren Dresser and William H. Price the gas interest of this country is deprived of the counsel and services of two of its ablest and wisest advocates, and whose places will not easily or soon be filled. If we imitate their examples and follow their teachings, not only in our business but in our daily life, the world will be better for our having lived in it.

During the past year, while our business has steadily progressed and increased, little has transpired that has been of unusual importance. The general tendency is toward a reduction of prices; and, as a rule, this means increased sales, which, in turn lowers the cost of manufacture. Kerosene oil still remains our greatest competitor. While electric light has made some inroads, and, in some places, taken a small share of the business, yet this has been more than offset by the increased demand it has made for more light. That this is true is proved by the fact that in places where most electric light is used the increase in sales of gas has been greatest. Speculative schemes and failures mark the history of electric lighting companies on the other side of the water, where gas is sold at a low price.

During the last year, in the city of New York, in face of the fact that it is one of the best fields for electric light companies, and with the great promises and expectations which were to be realized when the Edison company reached a state of active operation, gas stocks have advanced from 10 to 40 per cent.; and when the sales of gas increase in a single year from 10 to 20 per cent. in a city like New York, where electric light has its best opportunities, the holders of gas shares will be likely to feel as easy as some of their friends, who may have been induced by the enticing representations of interested parties to invest in electric light stock.

As I have already said, prices have been generally reduced throughout the country. This proves that the cost of manufacture has been lessened, and to still further reduce it is the one absorbing topic with us all.

Too little attention is generally given to increasing the consumption of gas during the day. As 100,000 cubic feet increased day consumption is almost equal, in some respects, to double that quantity during the night, it is apparent that efforts in this direction must be well directed, for such increase can be supplied without materially increasing the plant.

The most promising field for encouragement in increasing day consumption is the sale and use of gas stoves for cooking and heating. This subject has received such attention during the last few years that it is now no longer a question whether such work can be well and economically done,; but we hazard nothing in saying that the cooking, especially, can be done in no

* Now President of Brooklyn Gas Light Company, N. Y.

other way so well. The lower the price at which we sell our gas the more successful will be our efforts; for when the people know that the work of the kitchen can be done better, and at the same time more economically, by gas than by coal, to say nothing of the convenience and cleanliness of gas as compared with other fuel, they will not long be without a good gas stove. Although we talk about gas stoves a great deal, and the subject is discussed at our meetings time after time, yet few of us give the subject the attention which its merits demand. Perhaps one reason is that many of us cannot afford to sell gas at a rate that is low enough to encourage our consumers to use it for cooking and heating.

At our last annual meeting I endeavored to show, by a comparison of results, an approximation of the value of the benefits which may be derived by abandoning some of our old style bench and furnace work and adopting such as will carbonize more coal on a given plant, and that, too, with a less consumption of fuel per ton of coal carbonized. I was not surprised that the results of my efforts developed a feeling of sensitiveness among some of the members, which, if it were general, would hardly be encouraging to us as an association, and which, in my judgment, is one of the main hindrances to our progress in actual practical work in the retort house. It also explains, to some extent, the fact of the disinclination of our members to bring before us at our meetings papers embodying these facts, and the results of practical achievements in our several works.

This feeling among some of our members—for I fancy it is not a general one—that the simple fact that a pound of coal will make a certain quantity of gas, that this pound of coal costs a certain sum of money, that a retort will produce so many thousand feet of gas, that a bushel of lime will purify such and such a quantity of gas, etc.—that these things are secrets which cannot be obtained and known by anyone who will take the trouble to set himself in the way of finding out about such, is a delusion and a mistaken idea.

We may take up questions in chemical physics; we may discuss the constitution of matter; we may explain molecular and chemical attraction, as well as analysis and synthesis; we may elucidate the laws of chemical combination; the analysis and movements of light; the relations of matter and force, etc., etc., all of which are in the highest degree interesting and useful —yet the practical man goes home with, perhaps, not a single new idea in his head, the application of which will enable him to save a few cents in the production of a thousand feet of gas. But when a member comes forward with a paper on some special subject, and shows how you can save one, two, three, or ten cents on each one thousand feet of gas you make, behold, some one exclaims, "You are letting out the secrets of the business."

This appearance of endeavoring to keep secret everything connected with the manufacture of gas, in my opinion, has done as much to engender and foster the ill feeling sometimes entertained toward gas companies as any other one cause. Jealousies and ill feeling are generally developed from lack of knowledge—ignorance. Confidence is based on knowledge; and just in proportion as a knowledge of the facts is disseminated, just in that proportion will ignorance be dispelled and good feeling prevail.

What means this large attendance at our annual meetings of members scattered over a territory embracing more than 65,000 square miles, if such be not a general desire on the part of the members to obtain information, to learn something relative to the manufacture and distribution of gas, and return home with an idea of some improved method of working, in some department, which will tend toward a saving in labor and expense, and so hasten the day when a reduction in the selling price of gas may be made, and, at the same time, earn a fair return on the capital invested? It betrays an ignorance in regard to our business to flatter ourselves with the idea that none but our individual selves have a knowledge of the details relative to the cost of making a thousand feet of gas.

This ignorance in regard to our affairs is quite sufficient to explain the reason why, in many of our cities, municipal officers have been ready, not only to allow speculators the privilege of building works and occupying the streets, but to actually aid them in their endeavors to establish opposition gas companies, when the fact is patent to every one who has any knowledge of the matter that never, in a single instance, in this or any other country, has an opposition gas company permanently benefited the people, but without exception they have burdened the business with an unnecessary capital which ever afterwards has been a hindrance to a reduction of the price of gas.

Our business must succeed or fail upon the real merits of the article which we offer to the public. Whenever something better, cheaper, more convenient and better adapted to the wants of the public is developed, it will surely take the place of gas. If our customers have confidence in us, if they know that we consider that their interests are identical with our own, that we aim to serve them to the best of our ability, they will be slow to encourage the placing upon their own backs a load which speculators have often lifted upon them under the pretence of introducing a "patent process" and furnishing a better and cheaper gas.

In European cities the people have been educated to this fact, having seen to their cost the outcome of the delusive schemes of speculators in establishing so called opposition gas companies, so that now the legitimate gas companies are protected in their chartered rights and business and in return furnish the goverment, at stated periods, with a report of their doings and operations. It is an imperative duty with us, in the first place, to have and maintain the confidence of the people of our respective cities and towns; and this cannot be done by withholding from them all such information relative to our business as is clearly for our mutual interest for them to have. If we bring to bear the scientific ability, the inventive genius, within our own ranks, and show as much earnestness, energy and zeal as our electric light friends have for some time been doing, we can maintain the position we have so long held in the business of furnishing artificial light. We stand to-day without a real rival in the business, but we cannot maintain our position by feeling perfectly contented to plod along in the same ruts which our grandfathers made. We must put aside all prejudices or jealousies, if we have any, and endeavor to look with a clear eye to the facts, for "facts are stubborn things;" and yet I have a great deal of sympathy for those who are governed to some extent by prejudices, and consequently have their judgment slightly warped; for where we see gentlemen of well-known scientific attainment and ability testify, over their own signatures, that when 25 or 30 per cent. of the volume of a gas which is supplied to the public for illuminating or heating purposes is that deadly poison commonly known as carbonic oxide, that it is as harmless as 5 or 6 per cent.; to whom shall we apply for a candid, honest opinion, especially when all chemical text books, and all instructors in the science, teach directly the opposite?

We can safely afford to run the risk of being called "old fogies," for declining to be duped by speculators; but we cannot afford, for the sake of possibly putting a few dollars in our pockets, with our eyes wide open, with a positive knowledge of the facts and what we are doing, confirmed by the experience in several cities during the last six or seven years, to send out to the people, who are innocent of its nature, an article the use of which leaves in its wake such a death list as is charged to so-called water gas. Many people will consent to run the risk of being poisoned to death by water gas, provided they can purchase it at a cheaper rate than coal gas. But it seems to be a fact that coal gas companies are steadily striving to reduce the price of gas to their consumers, while water gas companies, where they get an opportunity, advance the price, as witness the case in Brooklyn to-day.

The possibility of cheapening the cost of production of coal gas, without doubt, is far greater than in the case of water gas. Aside from the increased value that science is steadily developing from our residual products —in the case of water gas there are no residuals, not even the fuel, which must be purchased—the retort house, as I have already said, is the place where we have the greatest opportunities for cheapening the cost of production.

At our last annual meeting I endeavored to show where a sum approximating to $1 per ton, could be saved in the carbonization of the coal.

I desire now to ask your attention to a comparison of results embodying the cost per 1,000 cubic feet of gas for retorts and settings. We all know that the best work is obtained from a bench of retorts, which can be started and run continuously.

When circumstances compel us to start a bench, and, in a short time, stop it, the next time of firing we lose a quantity of gas that would be saved in continuous working, and the changes due to expansion and contraction, when the bench is not performing continuous work, are detrimental to, and shorten the life of, the retorts.

The question is often asked, "How long should a bench of retorts last?" In a stack of 20 benches of "sixes," with the common form of $14'' \times 26'' \times 9'$ retorts, and with the ordinary style of furnaces, the average length of time each bench was in actual use was 577 days. The longest time any one bench was in actual use was 759 days, and the shortest period was 186 days. One bench was fired, and let down, three times, being in actual use just 202 days. Nine benches were fired, and let down, twice each; the average length of time they lasted being 470 days. Ten benches were fired and run continuously; the average length of time they lasted was 711 days.

After the first settings were removed 10 benches were renewed with the same kind of retorts and settings as were used previously, and the average length of time they lasted was 256 days.

They were fired and let down as follows: One bench, once; five benches, twice each; three benches, three times, and one bench four times. I should state, with regard to the ten benches, that, had circumstances not compelled stopping them, most of them would have lasted an additional length of time; but they were in such condition, when let down, that it was not considered economical to fire them again. Besides the ten benches last referred to, six benches, of the same stack, were renewed with what are known as the Davison retorts and settings. They were started and run continuously, the average length of time each bench lasted being 629 days. Other things being equal, the longer a retort will last the better it is for our work; but one other consideration should not be lost sight of, and that is the *quantity* of gas produced by each retort.

In the first setting of the benches referred to, with coke fires, each retort produced an average of 4,168,248 feet of gas. In the second setting the ordinary retorts produced an average of 1,914,360 feet each, and the Davison retorts produced 5,642,130 feet each.

To bring the matter still more forcibly to your attention, I have prepared a table showing the different quantities of gas that a retort will produce, with quantities per 24 hours varying from 6,500 to 12,000 feet, and with 12, 18 and 24 months' continuous use, respectively :

Comparison of the quantity of gas a retort will produce during 12, 18 and 24 months :

Quantity of Gas Made by Each Retort per 24 Hours.	Quantity of Gas Made when a Retort lasts— 12 Months.	18 Months.	24 Months.
6,500	2,372,500	3,555,500	4,745,000
7,000	2,555,000	3,829,000	5,110,000
7,500	2,737,500	4,102,500	5,475,000
8,000	2,920,000	4,376,000	5,840,000
8,500	3,102,500	4,649,500	6,205,000
9,000	3,285,000	4,923,000	6,570,000
9,500	3,467,500	5,196,500	6,935,000
10,000	3,650,000	5,470,000	7,300,000
10,500	3,832,500	5,743,000	7,665,000
11,000	4,015,000	6,017,000	8,030,000
11,500	4,197,500	6,290,500	8,395,000
12,000	4,380,000	6,564,000	8,760,000

Based on a cost of $375, for renewing a bench of 6 retorts, including the taking down and replacing of the iron work, also repairing the furnace, and taking the production of gas per retort as above stated, the approximate cost per 1,000 cubic feet of gas for renewing the retorts, settings and furnace, would be as follows :

Production per 24 Hours.	Cost per M. for 12 Months. Cents.	Cost per M. for 18 Months. Cents.	Cost per M. for 24 Months. Cents.
6,500	.1580	.1054	.0790
7,000	.1467	.0979	.0733
7,500	.1369	.0914	.0685
8,000	.1284	.0859	.0642
8,500	.1208	.0806	.0604
9,000	.1141	.0762	.0571
9,500	.1081	.0721	.0541
10,000	.1027	.0685	.0513
10,500	.0978	.0652	.0489
11,000	.0934	.0623	.0467
11,500	.0893	.0596	.0446
12,000	.0856	.0571	.0428

From which we see that a retort producing 6,500 feet per 24 hours, will produce in 12 months 2,372,500 feet; in 18 months, 3,555,500 feet; and in 24 months, 4,745,000 feet—the cost for retorts, settings, and repairs of furnace will be .1580 cents, .1054 and .0790 cents per 1,000 feet, respectively. With a retort which produces an average of 8,000 feet per 24 hours, for 12 months, the quantity will be 2,920,000 feet; for 18 months, 4,376,000 feet; and for 24 months, 5,840,000 feet will be produced; the cost for renewal of settings, etc., being .1284 cents, .0859 and .0642 cents per 1,000 feet, respectively.

If we can obtain from a retort 10,500 feet per 24 hours, without serious trouble or drawback of any kind, then we have in 12 months, 3,832,500 feet; in 18 months, 5,743,500 feet; in 24 months, 7,665,000 feet of gas costing, for renewals of settings, repairs of furnace, etc., .0978, .0652 and .0489 cents per thousand respectively.

These comparative figures will bear a careful study, and, acting upon the suggestions which they convey, with a little well directed effort, most of us can effect a saving of a few cents per 1,000 feet of gas which, in the aggregate, will amount to some thousands of dollars in a single year.

There are many other matters which should receive our attention, some of which will, no doubt, be brought before you in the papers which are to be read, and also in your discussions thereon; but feeling sensible that I have already occupied too much of your time, I will conclude my remarks by referring briefly to one thing more—and that is, the work of our Association.

I think it is not too much to say that the effective work of our organization, at least, should be doubled. In depending upon the voluntary presentation, by the members, of papers to be read and subjects to be discussed we have not been very successful. As a means of exciting interest among the members to make our meetings both interesting and profitable, prizes have been offered by individuals and by the Association, for the best dissertations upon subjects relating to our industry. This course has also failed to meet our expectations. One other method has occurred to me for making our meetings more interesting, instructive, and beneficial, and that is the appointments of special committees for special work.

A committee might be appointed at this meeting to select and recommend certain subjects for examination and investigation, and these several subjects might each be referred to a special committee for investigation by experiment, or otherwise, such committees to report at the next meeting of the Association. In this way many managers of small works could aid us materially by instituting experiments and trials, which would be wholly impossible in large works.

We want the results of practical work in any and all departments of our business. When any member steps out of the old beaten track and tries what may be an experiment, let us have the results, no matter whether such experiment has met with success or ended in failure. Our discussion oftentimes may develop the cause of failure; and perhaps, in some cases, open the way for success, and lead to the accomplishment of some desired end which might otherwise remain unknown, simply by reason of having overlooked some, under other circumstances, unimportant point.

If we each wait until we can bring out some important improvement, or make some radical change in our operations, we shall record but little progress. No really great achievements, or important practical results, are the outcome of a day. Little by little we add to our stock of positive knowledge, and step by step are we led onward through repeated trials and experiments; sometimes our fondest hopes blasted, at other times success crowns our efforts when least expected—or, perhaps, through some unforeseen accident the way is made plain for the accomplishment of some object upon which we may have spent days and months of thought and labor.

It is these varied experiences that we ask you to bring here, each contributing to the common stock of information from which members are sure to glean something which they will carry home with them, and lead them, involuntarily, to say, "This is one of the best meetings we have ever had." Let the Executive, or some Special Committee, be charged with laying out and preparing the programme for the next meeting of the Association. Let each member be notified, through the American Gas Light Journal, what special topics are to be discussed; then each will have an opportunity to refresh his memory by an examination of his records and making notes, and thus come to our meetings prepared understandingly to discuss the various subjects which are brought before the Association.

Let every member feel it to be a duty which he owes to the Association to contribute, in some way, as far as in his power, toward the development and realization of the objects so plainly set forth in our articles of agreement. Then will our brother gas engineers throughout the country feel it to be a privilege to attend our meetings, and we may take a just pride in being members of the New England Association of Gas Engineers.

Mr. Stiness—I move that the thanks of the Association be tendered to President A. B. Slater for the very able and instructive address delivered by him, and that the address be referred to a special committee of five with instructions to report, at this meeting, recommendations respecting the various topics therein mentioned.

The resolution was unanimously adopted; and the following gentlemen were appointed to serve as the special committee of five :

Messrs. S. G. Stiness, W. A. Stedman, C. D. Lamson, J. H. Armington and G. D. Cabot. Treasurer George B. Neal then presented the following report concerning the finances of the Association, Mr. Charles H. Nettleton and A. M. Norton, on behalf of the Auditing Committee, certifying that the accounts had been examined and found to be correct.

TREASURER'S REPORT.

The Treasurer reported as follows :

Receipts during past year	$545 07
Expenditures	516 21
Balance on hand	$28 86
Permanent fund—	
Invested in Charlestown Five Cents Savings Bank.	$300 00
Warren Institution for Savings	400 00
Total	$700 00

On motion of Mr. Stiness, the report was received and placed on file. The President here stated that Mr. A. C. Wood, of Syracuse, N. Y., in a letter to a member of the Association, expressed regret at his inability to be present at this meeting, and desired to be kindly remembered to the New England Association.

COMMITTEE ON STATISTICS.

The Committee on Statistics reported progress; and, on motion, the committee was continued for another year.

NOMINATING COMMITTEE.

On motion, the President appointed Messrs. F. C. Sherman, C. D. Lamson, and J. H. Rollins as a committee on nomination of officers for the ensuing year.

The Secretary—At a meeting of the Directors, held last evening, in addition to the business of approving the names of applicants for membership, it was voted that the assessment for this year be fixed at $3 for members formerly on the rolls, and at $5 for new members, as is the usual custom.

The Directors also approved the following papers, and recommended that the same be read before the Association :

"Modification of the Dieterich Furnace," by Charles H. Nettleton; "Benzine in Gas," by R. B. Taber; "Red Brick in Brickwork," by H. A. Allyn; "Description of New Works at Pawtucket, R. I., and Practical Working of Same for Past Five Months," by S. G. Stiness.

There were also two papers offered for the prize competition, and these were referred to Mr. Joseph R. Thomas for consideration.

[To be continued.]

Coal Gas as a Labor-Saving Agent in Mechanical Trades.

By Thomas Fletcher, F.C.S.

[At the Eighth Ordinary Meeting of the Society of Arts, London, Eng., held Wednesday, January 30, 1884, the following more than ordinarily interesting paper was read. We obtain our report of same from the *Journal* of the Society.]

Gas, as a fuel, is an absolute necessity to the economical carrying out of many commercial processes. It is often used in the crudest and most costly way. A burner may be perfect for one purpose, yet exceedingly worthless for another; and however good it may be, an error of judgment in its application may lead to its total condemnation. An excess of chimney draught, in cases where a flue is necessary, may pull in sufficient excess of cold air to almost neutralize the whole power of the burner, unless a damper is used with judgment. With solid fuel, an excess of draught causes more fuel to be burnt, but with gas the fuel is adjusted and limited; there is no margin or store of fuel ready to combine with the excess of air, which, therefore, lowers the amount of work done by its cooling power. The power of any burner, for any specified purpose, depends not only on its perfection, but to a far greater extent on the difference in the temperature of the flame, and of the object to be heated. For instance, if a bright red heat is required, it is not possible to obtain this temperature economically with any burner working without an artificial blast of air, the difference between the temperature of the flame and that of the object heated is too little to enable the heat to be taken up freely or quickly, and the result is a large loss of costly fuel. If we want to obtain high temperatures economically, an artificial blast of air is necessary, and the heavier the pressure of air the greater the economy. On the contrary, low temperatures and diffused heat are obtained best by flames without any artificial air supply.

For such purposes as ovens, disinfecting chambers, japanners' stoves, founders' core drying, and similar requirements, the best results are obtained by a number of separate jets of flame at the lowest part of the inclosed space, and the use of either illuminating or blue flames is a matter of no importance, as the total amount of heated air from either character of flame is the same. If there is any preference, it may be given to illuminating flames, as the proportion of radiant heat is greater, and this makes the average temperature of the inclosed space more equal; but, on the other hand, may be considered the greater liability of the very fine holes, necessary for illuminating flames, to be choked with dust and dirt. This may, to a great extent, be obviated by using very small union jets, and setting them horizontally, so as to make a flat horizontal sheet of flame. Burners placed this way are practically safe from the interference of falling dust or dirt, but not from splashes. Falling dirt or splashes must always be considered in the arrangement of any burners, and the ventilation must be no greater than is absolutely necessary for the required work. In cooking, this limit of ventilation may be exceeded, as most things are better cooked with a free ventilation, the extra cost of fuel being well compensated for by the better quality of the result.

The air in an oven or inclosed space heated by flames inside is similar in character to highly superheated steam. It contains a large proportion of moisture, and yet has the power of drying any substance which is heated to near its own temperature. A mass of cold metal placed in the oven is instantly bedewed with moisture, which dries up as the temperature of the metal rises. This is, for many purposes, an objection, and the remedy is to close the bottom of the oven and place burners underneath. If for drying purposes, and a current of air is necessary, the simplest way is to place in the bottom of the oven a number of tubes hanging downward, in such a position that the heat of the flame acts both on the bottom of the oven and sides of the tubes, which, of course, must be long enough for the lower opening to be well below the level of the flame. The exit may be at any level, but for drying purposes it is better at the top, and it should be controlled by a damper, to prevent cooling by excessive currents of air. If not otherwise objectionable, the arrangement of flames inside the oven is far the most economical in use.

Where an oven or drying chamber is used continuously, it should be jacketed with slag wool or boiler composition; but for many purposes this is no advantage. As an example both ways, I will instance the drying of founders' cores where there is only one blow per day. The cores of an ordinary foundry can be dried by gas in a common sheet iron oven in about half an hour; any accumulation of heat after that time would be useless, and a jacketed oven would be of no advantage.

For the disinfection of clothes in vagrant wards and hospitals for infectious diseases, on the contrary, a continued heat is necessary; and in this case the accumulation of reserve heat, which takes place slowly in a jacketed oven, becomes of value, as the gas can be turned low or out, and the ventilators closed, insuring a more complete disinfection with a much smaller gas consumption. Where an oven or heated chamber is much used for periods of over half an hour at once, a non-conducting casing pays well by reduced gas consumption.

For albumen and glue drying, leather enameling, tobacco drying, and purposes where a large space has to be very slightly and equally warmed when the weather is unfavorable, steam pipes are generally used; but, not being always available, an exceedingly good arrangement may be made by placing at intervals in the room gas burners, of any construction, close to the floor, and surrounded with a sheet iron cylinder, say 2 or 3 feet high. The tops of these cylinders must be connected throughout with a fairly large flue, which will take the products of combustion from the whole, and this flue must be carried either horizontally or with a slight rise, so as to utilize all the waste heat. The reason for having a number of stoves at intervals is that the heat in a flue will not carry, for any useful purpose, more than about 8 or 10 feet, and a single stove would give an irregular temperature in any except a very small room. If all are not used at once, the flues of those not in use may be closed by a damper to prevent down draught. The use of hot water pipes heated by gas may also be occasionally advisable, but, unless for some special reason, it is much more economical to use coal or coke, as the bulk of water makes an exceedingly good regulator, and makes a fire practically as steady and reliable as gas, thus superseding the more costly fuel.

For one of my own purposes I need hot water pipes, having very little variation in temperature night and day, and using coke for economy's sake, I get a regular temperature by heating a large quantity of water (about 200 gallons) with the fire, and inclosing this in a tank jacketed with slag wool. My circulating pipes run from this tank, and a practically steady temperature, night and day, can be obtained with the most irregular firing, and occasional extinction of the fire for several hours at once.

For the heating of liquids the greatest economy is to be obtained from one single flame of as high a temperature as can conveniently be obtained, and the flame must be in actual contact with the vessel to be heated. In jacketing vessels, to prevent draughts, care must be taken that the jackets do not cause currents of cold air to rise rapidly up the sides of the vessel, and so cool it. If this is the case, the use of a jacket, instead of being an economy, is a positive expense and waste of heat. Many processes, such as making oil and turpentine varnishes, require a heat under instant control; and in these the use of gas is an important matter, as the loss and risk of fire are very serious elements of expense, more especially in small works, where special and costly preparations for contingencies cannot be afforded. I have here a burner which, for its power, is perhaps the most compact, and gives

Fig. 1.—Special High-Power Burner, showing attachment B when used with a blast of air.

the highest temperature, of any burner yet known, and it is easily made in almost any size; it has, I think, many advantages. The use of gauze, which is its only weak point, is more than compensated for by the very high duties obtained in practice with it, owing to the compactness and concentration of the heat obtained. The following extract from my communication to the Gas Institute will give all particulars as to the constructive detail of this burner. Those who wish to go further into the matter will find the paper referred to in the publication of the Gas Institute for the current year, and also in the *Journal of Gas Lighting*, June 26th, 1883, and the *Review of Gas and Water Engineering*, June 16th, 1883.

"The first and most important part is the mixing chamber or tube, one end of which is supplied separately with gas and air, which at the other end are, or should be, delivered as a perfect mixture. It may be taken as a rule that this tube, if horizontal, should not be less than 4½ times, nor more than 6 times, its diameter. It is a common practice to diminish or make conical-shaped tubes. All my experience goes to prove that, excepting a very trifling allowance for friction, the area of the smallest part of the tube rules the power, the value of the mixing tube being no more than that of the smallest part. If the mixing tube is upright, new sources of interference come in, notably the varying specific gravity of the mixture. Except with one definite gas supply, the result is always more or less imperfect, and regular proportions cannot be obtained. This is now so well known that the upright form has been practically discarded for many years, and is now

only used where the peculiar necessities of the case give some special advantage.

"The diameter of the mixing tube is a matter of importance, as it rules the quantity of gas which can be satisfactorily burnt in any arrangement. With large flames, given a certain size of gas jet, the diameter of the mixing tube should be not less than ten times as great. For instance, at 1 inch pressure, a jet having a bore of 1-8th inch will pass about 20 cubic feet of gas per hour. To burn this quantity of gas a mixing tube is necessary 10-8ths or 1¼ inch in diameter. By the first rule this tube must be in length equal to 4½ times its diameter, or 5⅝ inches. It would appear that the mixing tube, having 100 times the area of the gas jet, is out of all proportion to the size necessary for obtaining a mixture of 1 of gas to 9 or 10 of air; but it must be remembered that the gas is supplied under pressure. It is therefore evident that no mere calculation of areas can be taken into account, unless the difference in pressure of the supply is also considered. A complete reversal of this law is shown in that ruling the construction of blowpipes, which I have already given in a previous paper on 'The Use and Construction of the Blowpipe.' In these, the air supply, being under a heavier pressure, is much smaller in area than the gas inlet; and to obtain maximum power, the air jet requires to be enlarged in proportion to the gas pressure.

"Given a certain area of tube delivering a combustible mixture, the outlet for this mixture must be neither more nor less than the size of the tube. Taking an ordinary drilled tube, such as is commonly made, and of the dimensions before given—*i. e.*, 1¼ inch bore—if the holes are drilled ⅛ inch in diameter the tube will supply 10 × 10 = 100 of these holes. In practice this rule may be modified.

"The variations from this rule, however, must be a matter of experience with each form of burner. There is also the fact that with small divided flames it is not necessary to mix so large a proportion of air, as each flame will take up air on its external surface; but in this case the flames are longer, hollow, and of lower temperature. As a matter of actual practice, where a burner is used which gives a number of flames or jets, the diameter of the mixing tube does not need to exceed 8 times the diameter of the gas jet; the remainder of the air required being taken up by the surfaces of the flames.

"Wire gauze, made of wire the thickness of 22 iron wire gauge, 20 wires to the linear inch, and tinned after weaving, has an area in the holes of 1-4th its surface. By calculation, the area of a gauze surface in a burner should therefore be taken at 4 times that of the tube, and our standard of 1¼ inch tube requires a gauze surface of 2½ inches in diameter. This rule is subject to variation in burners of a small size, owing to the air that can, if required, be taken up by the external surface of the flame, which, of course, is much greater in proportion in a small flame than in a large one. Where the diameter of the gauze is, say, not over one or two inches, the theoretical maximum gas supply may be exceeded, and a varying compensation is necessary with each size. My rule is intended to apply to burners of larger diameters, where the external air supply plays a comparatively unimportant part.

"It must be remembered that burners of this class, which burn without the necessity of an external air supply in a flame which is solid, require the mixture to be correct in proportions. A very slight variation makes an imperfect flame. Not only does the gas jet require to be adjusted with great precision, but more or less adjustment for different qualities of gas. An ordinary hollow or divided flame is able to take up on its surface any deficiency of air supply; but with the high-power solid flames the outside surface is small, and the consequence is that one of these burners, adjusted for gas of poor quality, may, when used with rich gas, give a long hollow or smoky flame, unless the gas jet be reduced in size. When perfect, the flame shows a film of green on the surface of the gauze; and if a richer gas is used the green film lifts away. To cause this to fall again, and to produce a solid flame, it is necessary to take out the gas jet and tap the end with a hammer until, on trial, it is found correct. If too small, the green film lies so closely as to make the gauze red hot. Where the 'tailing up' of the carbonic oxide flame is objectionable, there is no practical difficulty whatever in constructing these burners as a ring, with an air supply in the center, which greatly reduces the length of the 'tail.' In practice it is a decided advantage to have a center air-way in all burners of more than about 2 inch diameter, as it enables the injecting tube to be slightly shortened, and lessens the liability of the green film to lift with varying qualities of gas. In this class of burner I have adopted the small central air-way as a decided improvement in the burners."

In such processes as the roasting of coffee, chicory, grain, etc., a diffused heat is necessary, but of much greater intensity than can be obtained with economy from heated air. In these cases the application of a direct flame is necessary, and it may be in actual contact with the substances to be heated, provided these are kept in constant and rapid motion.

The use of a revolving cylinder brings in complications with any burner which is supplied with gas at ordinary pressures without any artificial air supply, as the currents of air caused by the motion of the cylinder interfere with the satisfactory working of any burner, and the air supply must be either protected from draughts and irregular air currents, or the air must be applied artificially from some independent source. One exceedingly good way of making any burner work, independently of the currents caused by a revolving cylinder, is to apply the flame inside of the cylinder at the center, making the substances to be heated to fall in a continuous stream through the flame. This system is not applicable to fine powders or sticky substances, as it necessitates the perforation of the cylinder, to allow of the escape of the products of combustion.

For this class of work a very concentrated heat is not desirable, as a rule, and a slit or perforated burner is preferable. Of this class of burner I have here a sample, which is not only new in its constructive details, but has

Fig. 2.

great and special advantages for many purposes. As you see, it resembles a number of ordinary furnace bars, with this difference, that each bar is a burner; in fact, it is an ordinary furnace grate, which supplies its own fuel. With the usual day pressure of gas, = 1 inch of water, this burner will, at its maximum power, consume about 100 cubic feet of gas per hour, per square foot of burner surface; and as it can readily be made almost any form or size, its adaptability for a great number of uses is evident. I have made it in many sizes and shapes, to give flames from ¼ inch wide by 5 feet long, to large square or oblong blocks. By applying a blast of air at the ordinary gas jets, and supplying the gas by a separate pipe, or series of pipes, below the open end of the burner, this can be converted into a furnace of extraordinary power. It is quite possible to burn as much as 2,000 cubic feet of gas per hour per square foot of burner surface, producing a heat sufficient to fuse any ordinary crucible. You see its power when I place a bundle of wire in the flame. It is, in fact, a concentration of hundreds of thousands of powerful blowpipe flames in one mass. It has also this advantage, that with a blast of air it will burn and work equally well any side up, and the flames can therefore be directed straight on their work without loss. It is, in one form or another, almost a universal burner, as it can be readily adapted to almost any purpose, from tempering a row of needles to making steam for a 200-horse power steam engine. It is easy to make, easy to manage, practically indestructible, and for commercial purposes has, I think, a general adaptability which will bring it, in one form or another, into almost universal use. I may say that when we are in a special fix, this has in every case landed us out of the difficulty.

For heating large plates of metal equally, for drying paper impressions for stereotypers, hot-pressing hosiery, crumpet baking, working up plastic masses, which can only be worked hot, and work of this class, a number of separate flames equally diffused under the whole surface of the plate are necessary to equalize the heat, unless the plate is very thick; and these are better if produced by a mixture of gas and air. But in heating wide plates one difficulty must always be remembered—the burnt gases from the center flames can only escape by passing over the outer flames, and therefore a space must be left between the top of the flame and the plate, or the outer flames will be smothered and make a most offensive smell.

In hosiery presses, printers' arming presses, and many others, the top plate also requires to be heated. The best way to do this is to use a number of blowpipe flames directed downward. In many cases the supply of air under pressure is a practical difficulty and objection. This is overcome, to a certain extent, by the use of a thick upper plate with a number of horizontal holes, into which a Bunsen flame is directed. In every case I have seen, without one single exception, the holes are either too small or the burner is placed too close, and the consequence is that the gas, instead of

burning inside the holes, as it should, passes through partially unburnt, and is consumed at the opposite end, where it is absolutely useless, the flame not being in contact with or under the surface to be heated, and therefore doing no work. In hosiery presses this is a great objection, as the holes are so long that an equal heat is simply impossible, and the only remedy is to use a blowpipe flame, which forces sufficient air in with the gas to insure combustion where the heat is necessary. The same remark applies to crape and embossing rollers.

For the production of heat in confined spaces and difficult positions the use of an artificial blast of air is becoming an acknowledged necessity, and small Roots blowers now made for such purposes, and driven by power, are coming rapidly into use.

Sometimes a plate is required to be heated to a high temperature in one confined spot, and as an example of this, I may take the blueing of the hands of watches. For this purpose I have made several arrangements, and perhaps the best is a thin copper plate, bent down at one side to a right

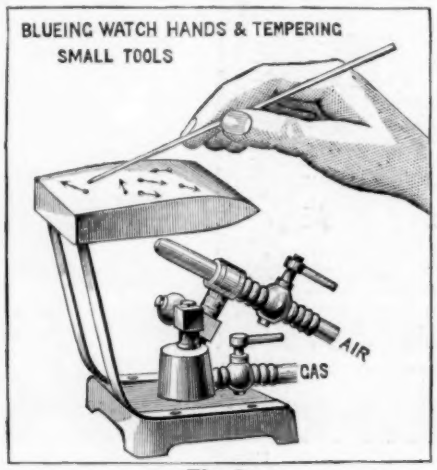

Fig. 3.

angle. In this angle, underneath is directed a very fine blowpipe flame on one spot, and the hands are passed singly over this spot until the color comes, when they are instantly pushed over the edge. I have here the arrangement which is generally used for this purpose. For the blueing of clock hands, a larger and more equally heated surface is required, and this can be obtained by a small powerful burner without a blast of air, using a rather thicker plate to equalize the heat. The same arrangement may be used with advantage for tempering small cutters for ornamental turning, pen-knife blades, etc., and in these cases the cooler part of the plate is of great value, as it enables the thicker parts to be slowly and equally heated up; the application of a mechanical arrangement to pass the articles to be heated in a regular succession is a matter easily managed.

Among other things which have several times come under my notice, may be mentioned cremation furnaces, but I have not yet met with, or been able to devise, any burner for ordinary coal gas which has worked satisfactorily.

This fuel is apparently unfitted for the work, and the best arrangement I know is a number of pipes delivering ordinary "producer" gas from the Wilson or Dowson generators, in exactly the same way as is at present used for firing horizontal steam boilers. For heating book-finishers' tools, a ring-flame is the simplest, the tools being supported a little distance above the flame; the usual plan of heating a plate, and placing the ends of the tools on this, necessitates at least double the gas consumption as compared with an open flame. For type-founding machines, bullet moulding, stereotype metal melting, solder making, lead melting, etc., one burner, or rather one flame, should be used of a suitable power for the work, and this should be as perfect and of as high a temperature as possible to ensure economy. It is now a simple matter, owing to recent researches in the theory of heating burners, to obtain flames of any power without practical limit, which, without any artificial air supply, will do all which is necessary in this class of work, and the required arrangements are exceedingly simple. With these trades may be classed, also, the concentration and distillation of acids and liquids boiling at a high temperature, and we may also include baths for tinning small articles, and the tinning by fusion of sheet copper, the same burners being applicable, and perfectly suited to all these requirements, unless the tinning baths are long and narrow, in which case the furnace-bar burners again come to the front as the best; as, if we are to use gas economically, the flame must be the same shape as the vessel to be treated.

We may now consider the heating of blanks for stamping, hardening the points of spindles, finishing the ends of umbrella tips, and work where a small article, or a small part of any article, has to be heated to a high temperature with speed and certainty. For these a long and narrow flame is necessary, and I may mention that in cases where a high speed of delivery is required, and a small part only has to be heated, such as, for instance, in the hardening of the points of spindles for cotton machinery, I have made burners giving a flame of exceedingly high temperature only ¼-inch wide and 5 feet long. This flame is produced by the assistance of a blast of air, and is of sufficiently high temperature to fuse the spindle in a few minutes.

Fig. 4.—Contrivance for Heating to Redness Small Objects.

The points only project over the flame, and the spindles are carried mechanically at such a speed that at the end of the 5 feet traverse they are red-hot, and drop into water. More than one hundred are in the flame at once, lying side by side.

For heating blanks for stamping, the furnace-bar burner is perfectly suited, and in this work the shoot supplying the blanks to the machine should be made of two fireclay sides, with an opening for the flame between the shoot and flame being placed at a sharp angle, to prevent risk of the blanks sticking or over-riding each other. A blowpipe may also be used with good effect, as shown in the next engraving, and in many cases it is preferable and much easier to manage.

In some cases the direct contact of the flame would spoil the articles to be heated, and instead of the arrangement mentioned, a tube of iron, fireclay, or other suitable material is heated, and the articles are passed through it. This system of continuous feed, through a tube, has been applied to the firing of small articles of pottery, and might possibly be well adapted, amongst other things, to the production of gas-burners.

Where the contact of air with the heated articles is injurious, many plans have been tried to keep the ends closed as much as possible, but I believe no more perfect and simple seal against the admission of air can be devised than to turn a jet of pure gas, unmixed with air, into each end of the tube. This is an absolute seal against the entry of oxygen in an uncombined state; free oxygen cannot exist at a very high temperature in the presence of coal gas.

For many trades there is a demand for hardened and tempered steel wire, either round or flattened, and the production of this has led to many attempts to obtain a satisfactory continuous process. The common method

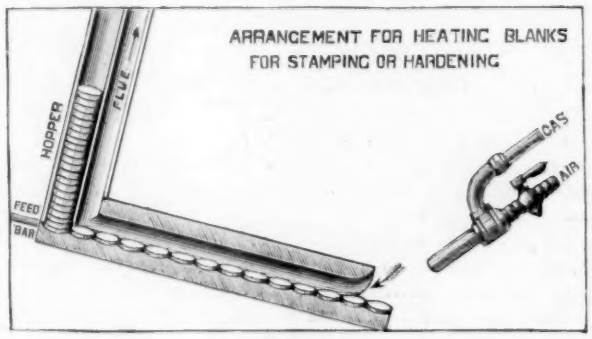

Fig. 5.

now, which is worked as a "secret" process by most firms, is to pass the wire through the tube to heat it, as already described, and to run it direct from the tube through a hole in the side of a box filled with oil, the hole being packed with asbestos, to prevent leakage; from this it is passed through another similar hole on the opposite side, either over a plate heated to the right temperature, or over a narrow open flame of sufficient length and power to give the correct heat for tempering.

Where absolute precision is necessary, the gas supply must be adapted by an automatic regulator on the main, to prevent the slightest variation of heat. Once adjusted, the production of flat and round spring wire by the mile is an exceedingly simple matter. It is quite possible to obtain absolute precision in temperature by a proper adjustment of the gas pressure, and as this is, for tempering steel articles and some other purposes, a matter of great importance, it is worth some consideration. No pressure regulator alone will give an absolutely steady supply; but if we put on first a regulator, adjusted to the minimum pressure of supply, say 1 inch of water; and then fix another on the same pipe, adjusted to a slightly lower pressure, say 9-10ths of an inch, the first regulator does the rough adjustment, and the second one will then give an absolutely steady supply, providing always that the regulators are

both capable of passing more gas than is likely to be ever required. No regulator can be relied on for absolute precision, if worked up to its maximum possible capacity.

Amongst other applications of a long narrow flame of high power, may be mentioned the brazing of long lengths of tube, in fact the application of flames of this form, with and without a blast of air, for different temperatures, are almost endless.

The thousands of uses to which blowpipes are adapted are so well known, that they need no mention, except the curiously ignored fact that the power of any blowpipe depends on the air pressure. A compact flame of high temperature cannot be obtained except with a heavy air pressure, and the

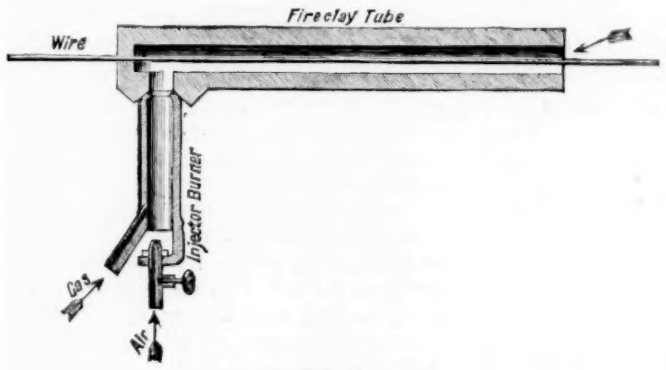

Fig. 6.

ignorance of this fact has caused an immense number of unexplained failures. Many people think that one blower is as good as another, and expect that a fan giving a pressure equal to, say, the height of a 2-inch column of water, should do the same work as a blower giving a pressure ten to twenty times as great. The construction and power of blowpipes, with the laws ruling the proportions and power, will be found in an article on "Blowpipe Construction," published in *Design and Work*, March, 1881, and as the matter is there fully treated, no further reference to the subject is necessary.

In the more recent forms of gas engine, the charge is exploded by a wrought iron tube, heated to redness by the external application of a gas flame. This, although considered satisfactory to the makers, appears to me to be an exceedingly crude way of getting over the difficulty; and I offer it as a suggestion, that a very small platinum tube shall be used instead of iron. This, if made with a porous or spongy internal coating, would fire the charge with certainty, at a lower temperature than iron, and it could be made so thin and small in diameter, without risk of deterioration or loss of strength, that an exceedingly small flame could be used to heat it up. As it would be fully heated in a very few seconds, the delay in starting would be obviated.

There are many purposes for which a red heat is needed for slow continuous processes on a small scale, such as case-hardening small steel goods, annealing, heating light steel articles for hardening, and a great variety of other similar processes. This, until recently, has required the use either of a rather complicated furnace, or a blast of air under pressure, to increase the rapidity of combustion. Since the conclusion of my experiments on the theoretical construction of burners, I have found that the high-power burners previously described, are capable of heating a crucible equal in size to their own diameter to bright redness without the assistance of a chimney, provided the crucible is protected from draughts by a fireclay cylinder.

This is an important point, as it renders the production of a continuous bright red heat a matter of the greatest ease, even in crucibles of a comparatively large size. Where the heat is steady, and certain not to rise above a definite point, it can safely be used for such purposes as hardening penknife blades, and other articles which are very irregular in thickness, the thin edges not being liable to be burnt or damaged by over-heating.

For the highest temperatures air under pressure is a necessity, as we require a large quantity of gas burnt in as small a space as possible with the maximum speed, and, given this air supply, we are very little hampered by conditions, as an explosive mixture may be blown through a gauze into a fireclay chamber, closed, except so far as is necessary to allow the escape of burnt gases. The speed of combustion is limited only by the speed of supply of air and gas, and by increasing these there is no practical limit to the heat which can be obtained. When we have to do with the reduction of samples of refractory ores, testing the comparative fusibility of different samples of firebricks, or alloys, etc., the use of an explosive mixture blown into and burning in a close chamber is invaluable, and the ease and certainty with which any temperature may be obtained has led to great discoveries, and the revolutionizing of many commercial processes. Recent experiments have proved that, by a modification in the form of the well-known injector furnace, an enormous increase of temperature may be obtained. I have, in actual work, obtained the fusing point of cast-iron in two minutes, starting all cold, and have fused every furnace casing I have yet been able to produce. If infusible casings can be made, I think I am not overstating facts in saying that any temperature required can and will eventually be obtained with the greatest ease. What the limit is I have as yet not been able to discover.

There is one more application of gas, as a fuel, which, discovered and published by myself some two years ago, has yet to become generally known, and in some special processes may prove exceedingly valuable. This is the addition of a very small quantity of coal gas, or light petroleum vapors, to the air supplied by a blower or chimney pull, to furnaces burning coke or charcoal. The instant and great rise in temperature of the furnace, and the greater stability of the solid fuel used, are extraordinary. This is, in fact, a practical application of the well-known "flameless combustion," the only signs that the gas is being burnt being a great rise in temperature and a decreased consumption of the solid fuel; in fact, if the gas is in correct proportion, the solid fuel remains unburnt, or nearly so, in spite of the high temperature. In cases where a sudden rise in temperature is required in a furnace, or where the power is deficient, this method of supplementing and increasing the heat will be found of very great service, and processes liable to be checked by making up a fire with fresh fuel can be carried on without check, even after the solid fuel has almost entirely disappeared.

That a solid fuel is quite unnecessary, I will prove in a very simple manner, by burning a mixture of coal gas and air without a flame, in a bundle of iron wire. The heat is sufficient to fuse the wrought iron with ease, and the glare inside the bundle of wire is painful to the eyes. The same result could be obtained by a pile of red-hot lumps of firebrick, and the same heat obtained also without a trace of flame.

It is not possible to enter fully into such a wide and important subject in a single lecture, and the suggestions now given are simply hints for the guidance of those who need or desire to experiment. No doubt we shall have, after a time, some text-books and other literature on this subject, which is one of great importance to many industries; and it is necessary for experimental work and applications to new industries, that the experimenter should not only be able to purchase special burners, but that he shall have fundamental laws laid down which will enable him to construct them for himself, so as to have his experiments under his own control. The difficulty in the way of literature on the subject is that those few who have worked in the matter are busy men, with little time which is not already fully employed.

Pioneers on new ground have great liability to generalize and jump at conclusions, and the necessary exact work and detail must, to a great extent, be left to those who follow on tracks already roughly marked out.

Of the special trades which have come under my observation, I have only had time to mention a very few. It appears to me that there are very few manufacturing processes of any kind which could not be simplified by the use of gas as a fuel, from the production of electric light apparatus to the manufacture of explosives, cotton stockings, beer, catgut, glue, umbrellas, ink, fish-hooks, medals, stained glass windows, brushes, and other trades equally various, which come daily under my own notice.

Influence of Cement Mortar on Lead Pipes.

A late number of the *Metallarbeiter* illustrates the peculiarities exhibited by leaden pipes which had been imbedded for five years in a layer of Portland cement. A red coating was noticed from 1-24th to 1-8th of an inch in thickness, the appearance of which corresponded with that of oxide of lead as it is usually delivered in commerce. This coating was carefully removed and the particles of lead removed with it were separated by means of a magnifying glass. The specific gravity of this powder (carefully defined at 59° F. and reduced for a vacuum) varied between 8.002 and 9.670. This variation is explained by the presence of metallic lead mixed in the oxide of lead, and of carbonate of lead. Qualitative analysis demonstrated that this powder contained oxide of lead, lead, carbonic acid, water, and traces of calcium. The composition of the powder was as follows:

Oxide of lead	84.89
Lead	12.33
Water	0.99
Carbonic acid	1.53
Lime	Traces.
Insoluble in nitric acid	0.16

This coating on the lead pipe appears to have been formed by the action of the oxygen in the air in union with that of the lime contained in the mortar. It is remarkable that the action of lime-water on lead has also been noticed by Besnon.

The Key City Gas Company, of Dubuque, Iowa, has secured a contract for lighting the city's streets, covering a period of five years. Before getting this award the company had to make certain concessions, particulars of which have not been forwarded us.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Cheaper Gas for Danville, Ills.—The Danville (Ills.) Gas Light Company reduced the price of gas, on April 1, 1883, from $2.40, $2.60 and $3, to $2, $2.25, and $2.50 per 1,000 cubic feet, according to varying scales of monthly consumption. This will be noted as having been quite a liberal concession, but the company is not disposed to consider these prices as final. At a recent meeting of the directors of the company it was decided to make another reduction, and it was ordered that on and after April 1, 1884, all customers should be charged at the rate of $2 per thousand, and all those whose monthly bills showed a consumption of 10,000 feet or over were to be granted a discount of 10 per cent. Secretary J. H. Woodmansee reports that the past year has been a most prosperous one for his company, and we join with Mr. W. in asserting that it is but reasonable to expect that the people of Danville will so appreciate the disposition and action of their gas company to sell its product cheaply that the gas consumption of 1884 will be correspondingly increased over the successful record of 1883.

This last reduction ought to make it rather unpleasant for the gentlemen whom, we understand, propose to operate, an electric lighting establishment at this place. An electric lighting company has just been organized there, but the incorporators of the same do not seem disposed to try domestic lighting, as the Jenney "arc" lamp system is the one to be installed.

Death in the Wires.—An employe of the Cambria Iron Works is reported to have been instantly killed by a shock from an electric light wire, received on the afternoon of January 29. It is said that the deceased held in his hand a steel rod, on the end of which was a wad of cotton waste with which he was oiling a track rail. The rod came in contact with an electric light wire, and the man fell dead, the lights in the works being extinguished at the same time.

Gas Killed this One.—A man named George Hall, 45 years of age, a resident of Brooklyn, N. Y., was found dead, on the morning of February 19, in a room in the North River Hotel, corner of Barclay and West streets, New York city. Hall had registered as a guest on the date mentioned. The room was filled with gas which had escaped from a burner that had not been turned off. The coronor's jury decided that deceased had met his death from suffocation, caused by the inhalation of illuminating gas.

A Gift from the Widow of Dr. Siemens.—Lady Siemens has given to the Society of Telegraphic Engineers (England) for its library, 230 volumes from the collection of her husband, the late Sir William Siemens.

Electric Street Lighting Banished from La Fayette, Ind.—Mr. William Wallace, Superintendent of the La Fayette (Ind.) Gas Light Company, writes us, under date of February 22, that "The electric light must go." He further says: "It may be of interest to gas companies situated as we have been for some time past, to know that after a close contest with the Brush, Jenney, and Vanderpole electric lighting companies, the La Fayette gas company has secured the contract to light the city's street lamps for the next three years. About two years ago the Brush Company secured a contract to light one district of this city by means of the tower system—one of these towers was set up, having five lights, of a claimed candle power of 4,000 candles each, and a consequent total illuminating value of 20,000 candles. Actual tests have shown an illuminating power of but 3,000 candles, and still the Brush Company has been paid the full contract price for 21 months. We think, however, that they will experience some trouble in collecting for the three remaining months of their contract, as an investigation has been asked for.

"The following were the bids presented this year, and under which we obtained the contract:

"Brush Company, 60 lights and three towers, of four lights each, $11,700. Jenney Company, 60 lights, and three towers four lights each, $10,800. Vanderpole Company, 60 lights, and three towers of four light each, including cost of building towers, $10,680. La Fayette Gas Company, 365 lamps, $25 each, including repairs, heads, globes, etc., $9,225.

"It will be seen by the foregoing figures that the bid of our company was the lowest by $1,455. In the specifications attached to the bid of the Brush Company it was required that the lamps should not be located at a greater distance than 700 feet apart. To locate the lights in that style would require 182 electric lamps to displace the 365 gas lamps, making total cost of the arc illumination about $24,000.

"The Committee on Light asked for bids on 60 lights, with the apparent object of making the electric light seem the cheapest. A large majority of citizens have been very much dissatisfied with the illumination furnished by the Brush Company." If the La Fayette Gas Company could compete successfully with the electric folks, and charge $25 per annum for each gas post, we do not see how the "light of the future" is going to prove very troublesome in street illumination operations in any section of the United States.

Cheaper Gas for Brockton, Mass.—Mr. David Brayton, Superintendent of the Brockton (Mass.) Gas Light Company, informs us that his company recently made the following schedule of prices:

One thousand feet and under per month, $2.25; between 1,000 and 5,000, $2.10; 5,000 and over, $2 per 1,000 feet.

The North Adams (Mass.) Company Makes a Reduction.—Mr. F. S. Richardson, Secretary and Treasurer of the North Adams Gas Company, writes to the effect that, on and after April 1 next, gas will cost consumers $2.50 per 1,000, with a discount of 10 per cent., to those customers who burn 25,000 cubic feet per month, the price will be $2 per 1,000. The ruling rate is $3 with 10 per cent discount.

Brooklyn (N. Y.) to Enjoy the Benefits of Further Opposition.—And now comes the news that Brooklyn is to have another gas company, a certificate of incorporation of the Brooklyn Equitable Gas Light Company having been filed with the Secretary of State at Albany, N. Y., sometime during the last fortnight. The capital stock of the new corporation has been placed at $1,000,000, divided into 10,000 shares, the company to exist for 50 years, according to the provisions of the charter. The officers and directors are the following: R. M. C. Graham, President; E. Jerzmanowski, Vice-President; H. Keene, Secretary; J. Bertschman and J. R. Telfair. These names will be noted as familiar in connection with the operations of the Equitable Company, of New York city, and it is safe to presume that the new Brooklyn corporation proposes to employ the same system of manufacture—generally supposed to be the "improved" Tessie du Motay process. When is this thing going to stop; Brooklyn possesses at the present time no less than seven gas companies, and, in some sections of that city, $2.50 per 1,000 cubic feet is being charged for gas.

The Louisville (Ky.) Gas Company not Drowned Out.—Last year, during the prevalence of the floods, the Louisville Gas Company showed great lack of energy in not protecting its property against the ravages of the raging waters. That the failure of the manufacturing plant to supply light during the "watery period" of 1883 is to be charged directly to want of energy then is plainly shown by what was done last month at the same point. Some of the more enterprising men in the directory of the company decided that it would be worth while trying to keep the works going this time, and they were "kept going." Plans for accomplishing the desired object were submitted by Mr. A. H. Barrett, and these plans were eminently successful; we hope to give the exact details of the same a little later on. In connection with this it may be here stated that, during the flood of 1884, the water reached a higher level by 2 feet 11 inches than was recorded for 1883. With the aid of a 110 foot holder at the works, and another of a similar capacity in a higher section of the city, gas was continuously supplied. Of course, it must not be inferred from the above that the failure of the gas supply in other cities on the line of the flooded districts is chargeable to neglect. Take Cincinnati, Ohio, for instance; owing to the features of the gas works there as situated, all the energy and capital in the country combined could not keep the water from cutting off manufacturing operations when a certain altitude in the flow was reached. A similar statement will apply to Wheeling and, in fact, to every other situation in the flooded districts where the gas makers were obliged to suspend manufacture. We only speak of what was done at Louisville to show that the action taken this year might just as readily have been accomplished in 1883.

Suffocated by Gas.—At Lexington (Ky.) on the morning of February 16, an odor of escaping gas was traced to room 31 of the Ashland House, located in the above-named city. The proprietor was informed of the escape, and the door of the apartment was broken open. The porter entered, and found the inmates, two young men, dead. They had registered at a late hour the previous night as Wallace W. Brockman, of Midway, Ky., and Richard Craig, of Lexington. Brockman had partly arisen, appearing to have been overcome before he could reach the window. He was found sitting on the bed, his body doubled over and his head nearly touching his knees. The position in which Craig's body was found indicated that he had also become aware of the danger threatening him. The coroner summoned a jury, and the evidence presented showed that the deceased had been "indulging in strong drink" on the night in question, they retiring to rest at about midnight. Those in the adjoining room testified to not having heard any noise during the night, nor did they perceive the smell of escaping gas. The physicians gave evidence that death was caused by asphyxiation, and a verdict was rendered accordingly. The jurymen also gave it as their opinion that the gas had either been blown out, or turned off and then turned on again.

On the same date W. D. Ray, of Helena, Ky., was also found, at the Phœnix Hotel, Lexington, Ky., suffering from the same cause. After much difficulty Ray was restored to consciousness. He said he had blown out the gas on retiring. Water gas is manufactured at Lexington.

Gas Matters at Auburn, N. Y.—The Auburn (N. Y.) Gas Light Company's plant has, owing to the rapidly increasing growth of gas consumption in that city, become insufficient to meet the demands made upon it. In consequence thereof a contract has been made with B. Kreischer & Sons, New York city, for the erection of four new benches of "sixes;" the iron work for same is to be furnished by Mr. James R. Floyd, proprietor of the Oregon Iron Works. Other extensive improvements are to be made in the summer and fall, which we will chronicle at the proper time. The business of the Auburn company has increased fully 20 per cent. over that of the past year, and the same ratio of progress is being steadily maintained in face of the fact that the Thomson-Houston electric light people started in to maintain and operate an electric light plant there in December last. Auburn has the reputation of being the best lighted city, as to its streets, in Northern and Central New York. There are 750 gas lamps equipped with 5 and 6 feet burners. Of these lamps 100 are lighted from sunset to sunrise, the remaining 650 being lighted at sunset and extinguished at 1 A. M. The short-service lamps cost the city $20, and the all-night service $30 per lamp per annum, the gas company including in this price all charges for lighting, extinguishing and maintaining. Auburn has 28 miles of street mains, and charges it consumers from $2 per 1,000 to $2.25 per 1,000, according to quantities of monthly consumption.

Changes in the Management of the Louisville (Ky.) Gas Light Company.—At a meeting of directors of the Louisville Gas Light Company, held February 22, the following officers were elected: President, John G. Baxter; Vice-President, Thomas S. Barret; Engineer, A. H. Barret.

Another Death in New York City.—An unknown man, about 40 years of age, a guest at Frank's Hotel, No. 60 West street, New York city, was found dead in his room on the morning of February 23. The supposition is that deceased had blown out the gas, at least that was what the jury gave as their verdict. We have it on the best of authority that all the large hotels, on the west side of town, below Grand street, have in their employ a porter whose sole duty is to patrol the halls of the buildings, looking out for gas escapes. It is high time that our suggestion of last spring, recommending the addition to the weekly mortality record of a column headed "asphyxiated by gas," was carried out. It would not often be returned blank.

Still They Come.—And now comes another step in the line of march that tends to safety; brother Butterworth is the officer in command of this particular division—still it is no new thing to see Mr. B. figuring in the role, he has "been there before." We give the particulars in his own words:

"Notice to gas consumers, and citizens of Rockford (Ills.) generally. One of the fixed and regular rules in the management of the Rockford Gas Works has been to divide the profits, as sales increase, with its patrons, in the shape of a reduction in price. In conformity with that rule, I have the pleasure to inform you that, after April 1 next, all bills showing a monthly consumption of 50 cents in value, will be charged for at the rate $2.25 per 1,000; bills showing a consumption of 1,000 to 10,000 feet, $2 per 1,000; from 10,000 to 20,000 feet, $1.87½ per 1,000; from 20,000 to 35,000 feet, $1.75 per 1,000; from 35,000 to 50,000 feet, $1.65½ per 1,000; all consumption over 50,000 feet monthly, $1.50 per 1,000.

"These prices are specially for our manufacturers and large consumers. At the same time I would wish it to be distinctly understood that on the day Rockford contains 20,000 *bona fide* inhabitants the price of gas shall not exceed $1.50 per 1,000 cubic feet to smallest consumers. Respectfully yours,

Thomas Butterworth."

And this promise of Mr. Butterworth is not made in the expectation that the day on which Rockford's population will reach the requisite number is any great distance off. The city numbers now within its limits a population of almost, if not quite, 17,000 souls; and is not the sort of place to stop growing. We also understand that Mr. Butterworth proposes to supply gas to the city's lamp-posts at the rate of $1.25 per 1,000; and we are also of the opinion that Mr. Butterworth's district would be a rather good sort of place for opposition schemers to keep clear of.

Danger in the Wires.—The need of keeping one's eyes open to the dangers lurking along the aerial path of electric light wires received an illustration at Fitchburg (Mass.) on the evening of February 6. Messrs. Crocker, Burbank & Co., own a private telephone line extending from the Union Machine shop to their upper paper mill at West Fitchburg; this telephone line connects all the mills and manufactories owned by the firm, and also includes the residences of the partners in circuit. On the date mentioned, Mr. S. E. Crocker's attention was called to some electrical disturbance, through detecting the smell of smoke in his residence; in company with Mr. G. F. Fay, he repaired to the office of the Union Mill fearing that trouble might be brewing there. Mr. Fay investigated the matter, and being aware of the danger from a powerful current of electricity, took a stick to move the switch, and the office was instantly illuminated by the play of electricity on the wires of the telephone. About the same time a girl employed at one of the mills attempted to use the telephone, while she was adjusting the switch the electrical display was so pronounced as to make her thoroughly alarmed. The cause of the disturbance was found to be that at a point where an electric light wire passed over the telephone wire, the electric wire sagged in consequence of the weight of ice which had accumulated on it during the continuance of a storm of sleet; being swayed to fro by the wind, the insulating substance enclosing the wire was worn through sufficiently to allow the lighting current to pass through the telephone wire.

Death of Mr. M. W. Williams.—We are called upon, with real and true regret, to announce the death of Mr. Moses W. Williams, the energetic and efficient Secretary of the Terre Haute (Ind.) Gas Light Company. Although the deceased gentleman had not been in robust health for some time back, still possessed, as he was, with great recuperative power, the news of his demise came with startling suddenness. On Thursday, February 7, he was at his office as usual, but on the 8th and 9th was confined to his house. He appeared to be mending rapidly on the 10th, indeed, on that date, eat the evening meal at the family table. He slept well through the night, but at 6 o'clock (morning of 11th) his wife was awakened by his stertorous breathing; she instantly arose, heard him speak once or twice, but before she could summon aid he had passed away.

Mr. Williams was born in Hartford county, Conn., on May 18, 1828. He came to Terre Haute, while yet a very young man, in 1847 engaging in a general merchandise business, which, with the growth of the town, was gradually changed to an extensive drygoods establishment. He continued in this line for a number of years. In 1867 he was appointed treasurer of the Vandalia railway, filling the position with credit to himself and satisfaction to the company until he resigned in 1872. In February, 1873, he was elected to the post of Secretary of the Terre Haute Gas Light Company, in which corporation he had already been a stockholder for about 10 years. He was a stockholder in both of Terre Haute's National banks, and leaves considerable of an estate.

In August, 1852, Mr. Williams was united in marriage to Miss Margaret M. Wood. Some years after her death he married Miss Julia Gorham, Jan. 4, 1877. This second wife, a son (Charles W. Williams), and an adopted daughter survive him. Mr. Williams was a careful and prudent man of business, never indulged in speculation, although always to be found on the liberal side of any question. In the domestic circle he was the most affectionate of husbands and the kindest of fathers. Socially, he was full of pleasant humor and a most agreeable man to meet.

At a meeting of the board of directors of the Terre Haute company the following resolutions of esteem and regret were passed:

Whereas, Another worthy citizen, and officer of this company, has passed away, it is proper that this board should give, so far as words can convey, an expression of the loss this company and the community have sustained in the death of one who but yesterday was in active life; it is therefore

Resolved, That in the death of Moses W. Williams this company has lost an efficient member and a faithful, honest, and capable officer—one who, whatever fell in his line of duty to be done, did it well.

Resolved, That this community will deeply miss him, who, by his integrity, prudence, and business skill has furnished an example worthy of emulation by the business men of to-day.

Resolved, That we tender our heartfelt sympathy to the family in this sad bereavement, and as a feeble testimonial of respect for his name and memory, it is ordered that the foregoing be entered on the records of this board, a copy be sent to the family, and a copy be furnished the press for publication.

Mr. Milton S. Durham was subsequently chosen to fill the vacancy in the board caused by the demise of Mr. Williams.

Gas Explosion in a Toronto (Can.) Bank.—An explosion of gas occurred, on the morning of Feb. 25, in the vault of the Bank of Commerce, Toronto. George Shaw, the bank messenger, entered the compartment with a lighted lamp in his hand. The vault was filled with gas, which had escaped from a fully turned on burner, and contact of the explosive mixture with the lamp light caused a regular smash-up. All the windows in the office were blown out, and the building itself was badly shaken. Shaw was badly hurt, and some of the clerks at the desks were more or less injured. Our informant states that the vault light was left burning the night before, and the jar caused in shutting the compartment doors by a careless plumber, engaged in making some repairs, probably extinguished the burner. Damage, about $2,000.

Death of an Inventor.—Herr Julius Pintsch, of Berlin, is dead. His name is best known to gas men through his invention of compressed oil gas illumination, for use on railways, marine buoys, etc.

An Interesting Interview.

The Brooklyn (N. Y.) *Daily Times* gives the following account of an interview recently held between President Morgan, of the Nassau (Brooklyn) Gas Light Company, and the great and only Secretary of the Standard Oil Company.

Mr. Morgan paid a visit to the office of Secretary Rockefeller, and was courteously received. They sat down in the Secretary's office, and this was what took place:

"Well," said the President, "we would like to know just what you demand of us in this Brooklyn gas business. On what terms will you leave us alone and allow us to make gas in our own way."

"Demands!" ejaculated the Secretary, as he leaned back in his chair and folded his arms with an expression of the most profound astonishment. "We make no demands on any one. You ought to understand that."

"But we want to know what you require of us if you are willing to state it in plain terms."

"I object to that word also," rejoined Rockefeller, with a somewhat pacified air, as he resettled his chair on all four legs and began to look as though he really meant business. "We make no requirements of you. That is too harsh a term."

"Well, what do you want?" asked the President, in very plain English, getting a little exasperated over the cool deliberation of the minion of monopoly.

"Now, you are talking," returned the Secretary. "We think," he continued meditatively "that if you will give us half of your business—that is, if you will assign to us one-half of the district in which you have laid mains and in addition to that will give us one-half of your stock at the rate of 50 cents on the dollar—we may be able to compromise with you. In other words, we have come to the conclusion that this would be a fair arrangement."

To say that the President was a little amazed would be to put the matter delicately. He arose suddenly from his chair, looked squarely into the eye of the Secretary of the heaviest monopoly on the continent, and inquired tersely whether that was all the latter had to say. To which interrogatory Mr. Rockefeller responded that he had no other terms to offer.

"Very well," responded the President. "Then let me say to you that you cannot have one-half of our business nor one-quarter of our business, nor can you have any of our stock at 50. Good morning, sir," and he left the office. There is at present but war to the knife, and the knife to the hilt, between the Fulton Municipal as a tool of the Standard Oil Company and the Nassau.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

In Answer to "A. B. T."

COLUMBUS, OHIO, February 20, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:

It occurs to the writer that Mr. Keeling's answer to "A. B. T.'s" first question, asked in your issue of January 16, is not very satisfactory. It does not follow that tar will go to the purifiers, if the gas shows a temperature of 125° F. at outlet of scrubber, and going thence direct to purifiers. The gas might be cooled down to 60° or 70° before entering the scrubber referred to. I have seen the system practiced for years in a works where tar was never seen in the purifiers, and with increased illuminating power of the gas.

With reference to second question—as to the propriety of introducing a scrubber before the exhauster—the comparison made by Mr. Keeling is not good. Why an exhauster should be required to pump tons of tar and water every day, when the tar and water can be removed, without expense, is not clear to my mind. In practice, I run my gas through a pipe, 50 feet long, from hydraulic main to tar scrubber—a vessel 4 feet square, by 20 feet in height, and filled with rough boards, 6 inches wide by 3-8ths of an inch thick, held apart 3-8ths of an inch by a cleat nailed at each end of the board.

The gas enters this scrubber at a temperature ranging from 150° to 180° Fah., from thence to multitubular condensers, where temperature is reduced to 120°; then it travels through 200 feet of mains underground, and reaches the exhauster at a temperature of from 90° to 95°; thence through standard scrubber, which increases temperature from 2° to 5°; thence through air condensers, and a dry scrubber made similar to tar scrubber, and entering purifiers at 58° to 60°. Temperature is again raised in purifiers, and the gas passes the station meter at 62° to 68° Fah. With this style of working we have no trouble from our exhausters, and the register sheets will show as little variation in the pressure as can be presented by any plant with exhauster working next to hydraulic main.

Unless "J. S." can show that a temperature of say, 40° to 50°, is more favorable for the chemical union of ammonia with sulphuretted hydrogen and carbonic acid than is a temperature of 100° to 125°, his reply to "A. B. T." is fallacious. Certainly, no form of scrubber or washer will so intimately mix the three gases as they are mixed in flowing through the pipes.

A good washer or scrubber *adds no free ammonia* for utilization; on the contrary it removes the very ingredient that "J. S." values so highly as a purifying assistant, and the colder he gets his water the greater the waste of this valuable agent.

The writer gives it as his opinion that, with the conditions obtaining in a coal gas works apparatus, carbonic acid and ammonia do not readily unite and their union is easily divorced. Yours, etc., E.

An "Engineering Curiosity" again Referred to.

QUINCY, MASS., February 26, 1884.

To the Editor AMERICAN GAS LIGHT JOURNAL:

In your last issue of the JOURNAL I saw, under the heading of "Engineering Curiosities," a paragraph referring to the hydraulic main at the Rochester (N. Y.) Gas Works. I think it was in 1879 that I was appointed superintendent of the Rochester Company, and found the dip-pipes precisely as described in the paragraph referred to. Being desirous of remedying the evil, and, at the same time, not wishing to incur the expense of constructing new mains, I turned my attention towards the devising of some means of cutting off the pipes. The dips, instead of being attached to the main by flanges, were of the antique pattern, bells cast with the main, and the dips placed into them with a rust joint, which had become as hard as the iron itself.

I took one section of the main down from the stack, and tried to cut the joints with a chisel. This method I found to be impracticable, and it was then and there that one of my workmen suggested making an inside cutter to remove the surplus pipe. Acting on this suggestion we set at work to complete such an instrument, achieving success in a very short time. It worked to a charm, and in the course of a few days the pipes, 70 in number, were all cut off, the ends being as smooth as though they had been turned in a lathe.

I have no doubt but that the machine is still in the possession of the Rochester Company.

In this connection I would state that, while the directors of the company admitted the necessity of some effort at relieving the working of the main, they did not give me the hearty co-operation that I had the right to expect from them. I am now satisfied, however, they were not so much to blame, as some meddling busybody had told them I was ruining the works. I am informed, moreover, that the works are still operating under methods similar to those instituted by me, which would all go to indicate that the course I pursued was the right one, Yours, etc., A. D. PERRY.

The Market for Gas Securities.

Top prices do not seem to have been as yet reached for city gas shares, and Metropolitan gas, as usual, takes the lead; this stock is quoted now (Feb. 28) at 238 bid, and no figure obtainable to base an asking price—6 shares at auction, February 27, brought 238½; 50 shares, at auction, week previous, disposed of at 236. Manhattan gas, 272 bid, ex-dividend; 200 shares at auction, February 27, bringing 272¼ to 272½, all ex. Municipal gas higher, at 216 to 218; Harlem gas slightly stronger, at 120 to 123—100 shares at auction, February 27, at 121⅝, an eighth higher than auction lot of February 13, 160 shares selling then at 121¼. Mutual gas steady, at 134 to 137; New York gas buoyant, at 157 to 160 ex; Equitable higher, at 97 to 100.

Brooklyn (N. Y.) gas shares are also higher and close strong. We quote Brooklyn gas at 133 to 136—100 shares at auction bringing 135¾; Citizens, 91 to 93; Fulton Municipal, 115 to 120—this will be noted as an advance in bid price of three points. Peoples about steady, at 72 to 74; Metropolitan a shade better, at 86 to 89; Nassau gas evidencing surprising strength, quoted at 80 to 82; Williamsburgh gas steady, at 112 to 115. Brooklyn, according to lastest accounts, proposes to start some more opposition—the people interested in the New York Equitable Company intending to make "Rome howl" once more. They have obtained a charter and made a proposition to the Board of Aldermen, offering to supply gas to private consumers at $1.75, to public buildings at $1.50, and to light street lamps for $16 each per annum. Truly, the path of the Brooklyn consumer is studded with opposition's rocks—and wrecks.

Out-of-town shares do not exhibit much variation. Richmond county (S. I.) gas we quote at 70 to 75; Washington gas, 175 bid, offered at 200—some of a disparity; Citizens, Newark, N. J., same as last; Jersey City, ditto. Argument in the case of Consumer's opposition at Jersey City was to have been had at Trenton last week. Baltimore (Md.) Con. gas, 53-53¼. Nothing else of interest.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks (with W. B. Scott & co.)
34 Pine Street, New York City.

March 3.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Central	$466,000	50	60	—
Equitable	2,000,000	100	97	100
Harlem	1,800,000	50	120	123
" Bonds	170,000		—	—
Manhattan	4,000,000	50	272x	—
Metropolitan	2,500,000	100	238	—
" Bonds	658,000	—	105	110
Mutual	3,500,000	100	134	137
" Bonds	1,500,000	1000	104	106
Municipal	3,000,000	100	216	218
" Bonds	750,000		106	110
New York	4,000,000	100	157	160x
Northern	125,000	50	70	80
" Scrip	108,000			
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	133	136
Citizens	1,200,000	20	91	93
" S. F. Bonds	320,000	1000	106	110
Fulton Municipal	1,500,000	100	115	120
" Bonds	300,000		104	108
Peoples	1,000,000	10	72	75
" Bonds	290,000	—	105	110
" "	250,000	—	90	95
Metropolitan	1,000,000	100	86	89
Nassau	1,000,000	25	80	82
" Ctfs	700,000	1000	85	90

Notice to Contractors.

Office of Chautauqua Heat & Light Company,
Jamestown, New York.

Proposals will be received, up to **April 15, 1884,** for furnishing and laying **Fifteen Miles of Cast Iron Gas Mains** in the village of Jamestown, New York; the work to be completed by the first day of **October, 1884.** Specifications will be furnished upon application at the company's office, or by mail. The company reserves the right to reject any or all bids.

A. F. ALLEN BROWN, Secretary.

Jamestown, N. Y., Feb. 27, 1884.

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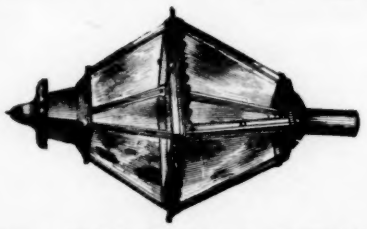

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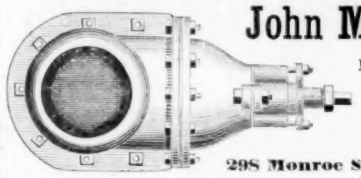

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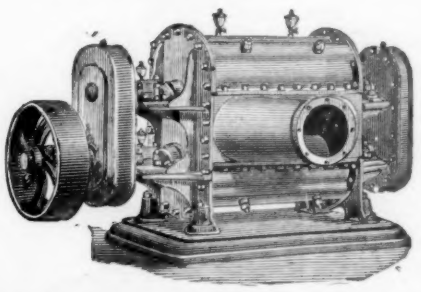

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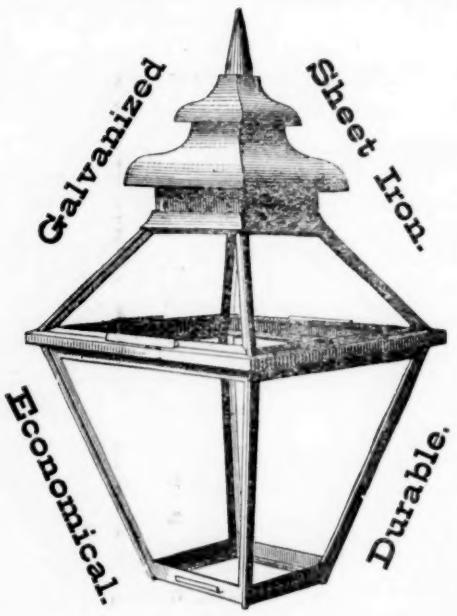

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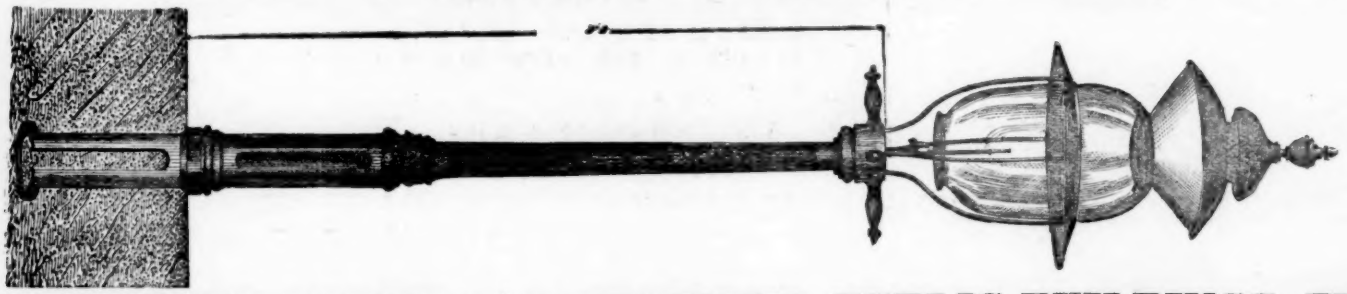

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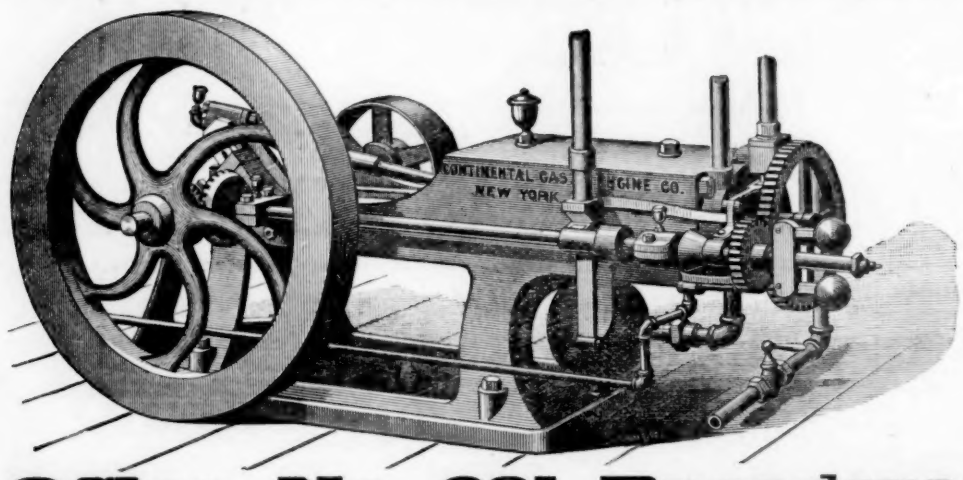

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